

INFORMATION SHEET

ORDER NO. R5-2009-_____
BYRON SANITARY DISTRICT
BYRON WASTEWATER TREATMENT FACILITY
CONTRA COSTA COUNTY

Background

The Byron Wastewater Treatment Facility (WWTF) treats the domestic wastewater from the community of Byron, which has 381 equivalent dwelling units (EDUs) equating to 68,600 gpd at 180 gpd per EDU.

The WWTF is currently regulated under WDRs Order No. 5-00-058, which set an average dry weather flow (ADWF) limit of 80,000 gallons per day (gpd). The 2007 annual average monthly flow was approximately 60,800 gpd with a maximum monthly average flow of 65,700 gpd. The existing facility consists of an influent pump station, bar screens, an Imhoff tank, six percolation/evaporation ponds, and a ten acre land disposal area. Groundwater is encountered about 3 to 5 feet below ground surface.

The purpose of the update in Waste Discharge Requirements (WDRs) is to address facility improvements to comply with Cleanup and Abatement Order (CAO) Order No. R5-2002-0733 and Time Schedule Order (TSO) No. R5-2005-0900. The CAO states that the facility has violated WDRs 5-00-058 by not completing required system improvements and impacting groundwater and surface water quality in regard to nitrogen and coliform bacteria. The TSO states that the discharger has violated both the WDRs and CAO for similar reasons and failure to submit progress reports. The CAO and TSO set a time schedule for report submittal to monitor progress of facility improvements but do not set any effluent or groundwater limits. All orders (WDRs, CAO and TSO) state that the facility is in need of significant improvements to address: 1) Effluent quality improvements, 2) Pond berm construction, which was expected to cause pond seepage into an adjacent wetlands that partially drains to Fisk Creek and eventually to the San Joaquin River by way of Discovery Bay, and, 3) Imhoff tank maintenance, which went more than 10 years without solids removal.

To comply with the above orders, the Discharger submitted a Report of Waste Discharge (RWD) describing plans to improve the collection system, replace the Imhoff tank and pump station with new headworks and pump station, remove sludge from ponds, improve wastewater flow configuration between ponds, improve the control and monitoring system, and replace three monitoring wells (MW1, MW2, and MW3) that were inappropriately placed, did not have construction logs and without adequate surface seals. The Discharger also submitted a Monitoring Well Replacement Workplan in November 2008 for MW 4 to relocate the well within the fenced area of the Discharger's property.

Groundwater Conditions

The region is known to have naturally occurring high saline groundwater as indicated by the high values of electrical conductivity (EC) and total dissolved solids (TDS) in background wells MW-6 and MW-7, which were at a minimum 22,000 umhos/cm for EC and 12,000 mg/L for TDS. While wells monitoring the WWTF's impact to groundwater indicate concentrations for EC and TDS that exceed Basin Plan limits, these concentrations are actually a near order of magnitude less than background concentrations.

The CAO and TSO state that the WWTF's operations have impacted the groundwater in terms of total coliform organisms (TCO), nitrate, and ammonia. However, the Discharger states that impacted wells are impaired and/or inappropriately located. Specifically, the construction logs for monitoring wells MW-1, -2, and -3 can not be located and do not have adequate surface seals resulting in surface water intrusion, which may have impacted monitoring results for coliform. The Discharger also states that MW-4 is not appropriately placed within the WWTF's controllable property boundary. Additionally, the Discharger claims that nitrate and ammonia levels in MW-3 and MW-4, which are adjacent to Fisk Creek, may have been influenced by irrigation drainage and dredging activity in Fisk Creek. The locality and monitoring data in MW-5 support this potential influence and show that upgradient wastewater ponds are not detrimentally affecting groundwater in terms of nitrate and ammonia. Additionally, coliform concentrations in MW-5 have not exceeded 2 MPN/mL since August 2006. A maximum concentration of 500 MPN/mL occurred once in May 2006 and only exceeded 2 MPN one other time in May 2005 at 13 MPN/mL. These concentrations potentially may have occurred due to sampling contamination. Therefore, MW-5 is considered to be the only monitoring well indicative of downgradient groundwater quality.

The RWD and supplemental *MW-4 Replacement Workplan* state that monitoring wells MW-1, -2, -3 and -4 will be abandoned and replacement monitoring wells will be constructed. The RWD provides a rationale describing the relocation of the new monitoring wells to positions less likely to be impacted by surface water intrusion and that will better monitor groundwater conditions underlying the facility. The *MW-4 Replacement Workplan* proposes a location within the fenced perimeter of Ponds 5 and 6 capable of monitoring downgradient groundwater conditions.

Basin Plan, Beneficial Uses, and Water Quality Objectives

The Byron WWTF is in the San Joaquin River Basin. Surface water drainage from the site is to agricultural ditches and Fisk Creek, which flow into the Sacramento San Joaquin Delta. The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins (Basin Plan) designates beneficial uses, establishes water quality objectives, contains implementation plans and policies for protecting waters of the basin, and incorporates by reference plans and policies adopted by the State Water Board.

The Basin Plan's numeric water quality objective for bacteria requires that the most probable number (MPN) of coliform organisms over any seven-day period shall be less than 2.2 per 100 mL in MUN groundwater. The applicability of this objective to groundwater designated as MUN has been affirmed by State Water Board Order No. WQO-2003-0014 and by subsequent decisions of the Sacramento County Superior Court and California Court of Appeal, 3rd Appellate District.

The applicable groundwater limitation for nitrate as nitrogen is the background groundwater quality. The background groundwater quality for nitrate as nitrogen ranged from 0.4 to 1.2 mg/L from May 2005 to November 2007, which is less than the California primary MCL of 10 mg/L.

The applicable groundwater limitation for ammonia as nitrogen is the background groundwater quality. The background groundwater quality for ammonia as nitrogen ranged from less than

0.1 to 0.3 mg/L from May 2005 to November 2007, which is less than the applied narrative Tastes and Odors objective of 1.5 mg/L.

Antidegradation Analysis

The antidegradation directives of State Water Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality Waters in California," or "Antidegradation Policy" requires that waters of the State that are better in quality than established water quality objectives be maintained "consistent with the maximum benefit to the people of the State." Waters can be of high quality for some constituents or beneficial uses and not others. Policy and procedures for complying with this directive are set forth in the Basin Plan.

The technology, energy, and waste management advantages of municipal utility service far exceed any benefits derived from a community otherwise reliant on numerous concentrated individual wastewater systems. Degradation of groundwater by some waste constituents released with discharge from a municipal wastewater utility after effective source control, treatment, and control is consistent with maximum benefit to the people of the State provided terms of the Basin Plan are met. Constituents of concern that have the potential to degrade groundwater include nutrients and coliform organisms, as discussed below:

1. While the groundwater monitoring data appear to indicate that groundwater has been impacted in respect to nitrate and ammonia resulting from wastewater application to unlined wastewater ponds and to the land disposal area, the Discharger states that data are not representative of WWTF activity. Subsequently, the Discharger proposes to reconstruct and relocate impaired monitoring wells to acquire more representative data as indicated in MW-5. Therefore, pending completion of a *Groundwater and Pond Evaluation Report*, there is no reason to require denitrification at this time.
2. The Discharger provides a rationale that indicates monitoring wells (MW-1, -2 and -3) are inadequately constructed and have faulty surface seals that allow surface water intrusion and thus caused the detection of naturally occurring surface coliform organisms. The fact that total and fecal coliform organisms have been less than 2 MPN/mL in MW-4 and have not been detected in MW-5 since August 2006 indicates that there may be adequate filtration at the wastewater treatment plant site. Although disinfection would reduce the potential threat, the use of sodium hypochlorite would also increase the salinity of the effluent and create trihalomethanes. Therefore, pending completion of the *Groundwater and Pond Evaluation Report*, there is no reason to require disinfection at this time.

For electrical conductivity, the background groundwater monitoring data exceeds all applicable Basin Plan limits. The minimum background EC concentration found between May 2005 and November 2007 was 22,000 μ mhos/cm. In comparison, for the same time period, the maximum downgradient groundwater EC concentration in MW-5 was 6,800 μ mhos/cm. Additionally, between May 2005 and December 2007 the maximum effluent EC concentration was 3,100 μ mhos/cm. Therefore, the discharge will most likely not impair the beneficial uses of groundwater due to increased salinity.

Treatment and Control Practices

After improvements, the Discharger will provide treatment and control of the discharge that incorporates:

- a. Alarms and operational procedures to minimize and prevent bypass or overflow;
- b. A flexible flow design between ponds to accommodate potentially high BOD loads without losing treatment capability;
- c. Appropriate biosolids storage and disposal practices;
- d. An Operation and Maintenance (O&M) manual; and
- e. The use of certified operators to assure proper operation and maintenance.

However, the effluent storage ponds and P/E ponds do not incorporate any specific measures to reduce the potential for groundwater degradation. As noted above, it is not entirely clear whether the WWTF has impacted underlying groundwater quality and the level of degradation that complies with Resolution No. 68-16 has not been fully evaluated. Therefore, it is appropriate for this Order to establish a schedule of tasks to formally evaluate groundwater quality and evaluate additional BPTC measures if unreasonable groundwater degradation has, or will, occur. Completion of these tasks, and implementation of the approved strategies developed from that work, will ensure that BPTC and the highest water quality consistent with the maximum benefit to the people of the State will be achieved.

Discharge Prohibitions, Specifications and Provisions

The Discharger's water balance capacity analysis indicates that the upgraded WWTF will provide the capacity to accommodate an average daily dry weather flow of 96,000 gpd between the months April through October, an average daily flow of 100,800 between the months November through March, inclusive, and a total annual influent flow of 35.8 million gallons.

The proposed Order prescribes groundwater limitations that implement water quality objectives for groundwater from the Basin Plan. The limitations require that the discharge not cause or contribute to exceedance of these objectives or natural background water quality.

As noted above, the background groundwater quality is highly saline, while the effluent discharge and underlying groundwater are substantially less. Therefore, as long as the Discharger implements BPTC, the effluent discharge is not expected to degrade groundwater quality and an effluent limitation is not being specified.

The Provisions require submittal of certain technical reports to verify completion of the proposed improvements and compliance with requirements to install monitoring wells, evaluate groundwater quality, maintain sustainable percolation rates for the P/E ponds and the potential implementation of BPTC measures as necessary to comply with the groundwater limitations.

Monitoring and Reporting Requirements

The proposed Monitoring and Reporting Program (MRP) is designed to verify compliance with effluent limitations, groundwater limitations, and operational requirements of the WDRs. The monitoring requirements of the proposed MRP are summarized in the following table.

Monitoring Location	Constituents
Influent	Flow, BOD, TDS, and EC
Pond	Freeboard, DO, pH, Odor, and Berm condition
Effluent	BOD, TKN, N-nitrate, Total nitrogen, EC, and TDS
Land Application	Flow, Land application berm condition, Rainfall, Acreage applied, Water application rate, BOD loading rate, and Nitrogen loading rate
Groundwater	Depth to GW, GW elev, Gradient magnitude & direction, pH, N-nitrate, N-ammonia, TKN, Total coliform organisms, EC, TDS, Standard minerals, and Metals
Biosolids	Quantity and quality of biosolids generated and stored on-site or hauled off-site for disposal